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and every moment expecting to raise a whale; sometimes seeing whole schools of them, but unable to get near them because of the young ice, for if the wind veers round to the northwest and snow falls, nothing can be done. The snow fills up all the lanes of water with slush that quickly freezes hard enough to stop boats and canoes. Then one can only go ashore; the whaling is over for that season.

But the whaling industry is almost a thing of the past. The present market and the price of bone for either white man or Eskimo and the closed season on fur have sealed the fate of the Arctic whaler.

PRINCE WILLIAM SOUND: THE GATEWAY TO THE INTERIOR OF ALASKA[1]

If we look at a map of the Pacific Ocean we will find that nowhere do its open waters extend as far northward as where they strike the southern coast of Alaska. Here they penetrate into the land mass of the continent in an open, crescent-shaped gulf—the Gulf of Alaska. At its head lies Prince William Sound (map, Fig. 1). From the seaward side Prince William Sound therefore has every advantage of location as the gateway into the interior of Alaska. But from the landward side its position is less favorable. Immediately back of it lie the Chugach Mountains with peaks 8,000 to 10,000 ft. high, and farther back of it the Alaska Range interposes its lofty wall, the sweep of whose mighty arc pivots around

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[1] Based in part on notes by G. T. Rude of the U. S. Coast and Geodetic Survey, but in the main on the following publications:

A. H. Brooks: Railway Routes in Alaska, *Natl. Geogr. Mag.*, Vol. 18, 1907, pp. 164–190.

A. H. Brooks: The Development of Alaska by Government Railroads, *Quart. Journ. Econ. (Harvard Univ.)*, Vol. 28, 1914, May, pp. 586–596.

Report of Alaska Railroad Commission. With maps, 1:250,000, in separate case. *House Doc. No. 1346, 62nd Congr., 3d Session.* Washington, 1913.

U. S. Grant and D. F. Higgins: Reconnaissance of the Geology and Mineral Resources of Prince William Sound, Alaska. *U. S. Geological Survey Bull. 443.* Washington, 1910.

A. H. Brooks: The Geography and Geology of Alaska. With map of Alaska, 1:2,500,000. *U. S. Geological Survey Professional Paper 45.* Washington, 1906.

A. H. Brooks: The Mount McKinley Region, Alaska. *U. S. Geological Survey Professional Paper 70.* Washington, 1911.

Map of Alaska, 1:5,000,000 (reduction of map accompanying *U. S. G. S. Prof. Paper 70.)* Pl. 1, *Petermanns Mitteilungen*, Vol. 53, 1907.

Map of Alaska by the Alaska Road Commission. 1:1,250,000. Washington, 1913.

Chart of Prince William Sound. 1:200,000. U. S. Coast and Geodetic Survey Chart No. 8550. Washington, 1913.

Prince William Sound as a center as if to cut it off completely from the interior.

These barriers would indeed isolate it effectually, were it not for the fact that rivers have worn their way across them. These natural depressions have predetermined the location of two main routes into the interior, one via the Copper and Delta Rivers, the other via the Susitna and Nenana.

In the case of the Copper-Delta route a river cuts its way entirely across each of the barriers. The Copper River, in one of its branches, rises at the southern edge of the Alaska Range and, flowing south, breaks through the Chugach Mountains, reaching the sea immediately to the east of Prince William Sound. Almost interlocking at its source with the headwaters of the Copper River, the Delta River flows north across the entire width of the Alaska Range to the Tanana lowland beyond. This route is followed by a wagon road and a military telegraph line and, in its southern portion, by a railroad line. Both the wagon road and the railroad do not start, however, from the mouth of the Copper River but from Prince William Sound, because of the protected harbors which its deep fiords supply. The wagon road, which was built and is maintained by the U. S. Army, starts from Valdez in the northeastern extremity of the sound, leads directly across the Chugach Mountains by way of Thomson Pass (2,750 ft.), and reaches the Copper River at Copper Center. The railroad strikes east from its terminus Cordova on the eastern side of the sound and skirts the coastal margin of the mountains for 40 miles before reaching the Copper River. This it then ascends to Chitina, its present terminus on the direct route into the interior, 132 miles from Cordova. The extension of this line to Fairbanks on the Tanana, the metropolis of central Alaska—a distance of 313 miles—was recommended by the Alaska Railroad Commission of 1913, but since the recent selection of the Susitna-Nenana route, referred to below, no such plan is under contemplation.

The Susitna-Nenana route is the one most favored by nature in that it has the least extent of mountain barrier to cross. In its southern part it follows the Susitna lowland, a broad depression, drained by the Susitna River, which forms the northern end of a great trough—here above sea-level, and to the south submerged (Cook Inlet and Shelikof Strait)—enclosed between the Aleutian-Alaskan and the Kenai-Kodiak mountain axes. The Susitna lowland penetrates to the very foot of the Alaska Range; the range itself is here crossed by an unusually low pass (Broad Pass, 2,500 ft.), which leads over to the Nenana River and thus into the Tanana lowland. The only drawback which this route affords is the fact that the upper end of Cook Inlet is closed to navigation by ice for four to five months during the winter (November to April). In order to have uninterrupted access the year round to this route its

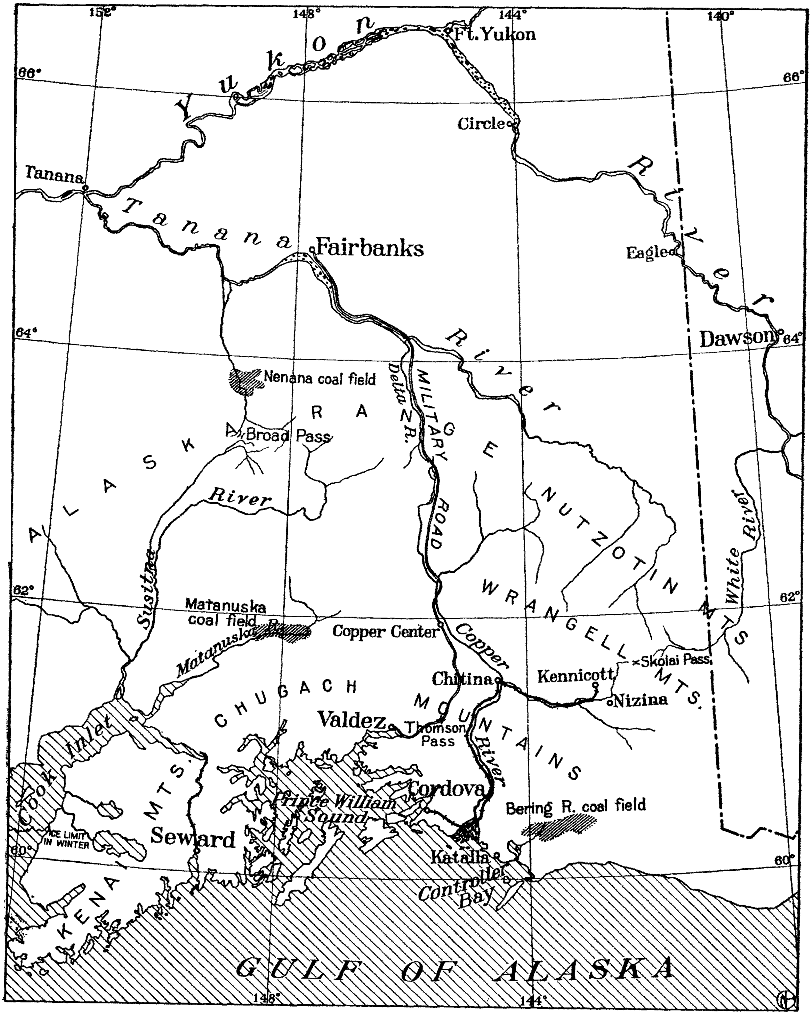

FIG. 1—Sketch map of the hinterland of Prince William Sound showing the two main routes into the interior of Alaska: (a) via the Copper and Delta Rivers, and (b) via the Susitna and Nenana Rivers (the Nenana River is the river, nameless on the map, which flows north from Broad Pass into the Tanana). Scale, 1:6,475,000.

starting point must be an ice-free port. Such is Seward, at the head of Resurrection Bay, an inlet on the southeastern coast of Kenai Peninsula, whose site was therefore selected as the terminus of the railroad constructed over ten years ago. This line runs north from Seward across the neck of Kenai Peninsula until it reaches Turnagain Arm, an arm of Cook Inlet, at Kern Creek Station, 72 miles from Seward. The original plan was to tap the important Matanuska coal field, keeping in view a possible extension to Fairbanks in the interior.

In August, 1912, provision was made by law for a commission to investigate railroad routes in Alaska. The report[2] submitted early in 1913 by this body, known as the Alaska Railroad Commission, was given serious consideration by Congress and led to the enactment, on March 12, 1914, of a law[3] authorizing the construction of a railroad from the Pacific seaboard to navigable waters in the interior. It was left to the President to select the route, and he chose the route along the Susitna and Nenana Rivers, to connect Seward with Fairbanks. In May, a new commission, known as the Alaskan Engineering Commission, was appointed to carry out the provisions of the act. Detailed surveys for the definite location of the line were immediately begun. The existing 72-mile stretch from Seward to Turnagain Arm was purchased by the government. The remaining portion to be constructed, from Turnagain Arm to Fairbanks, would be 391 miles long according to the estimate of the Alaska Railroad Commission. Construction inland is under way from Anchorage, a new town on Knik Arm, the other of the two inlets at the head of Cook Inlet.

While Seward seems the logical terminus for the government railroad, in view of its existing railroad connection, it may be worth while to point out that there is an alternative route of access to the Susitna-Nenana line which could make it directly tributary to Prince William Sound. At its base, Kenai Peninsula is narrowed down to a neck of land only ten miles wide between Turnagain Arm, on the Cook Inlet side, and Passage Canal, an inlet of Prince William Sound. Recent surveys by the U. S. Geological Survey[4] and the U. S. Coast and Geodetic Survey[5] show that this would prove a feasible route for a railroad. For six miles at the western end and one mile at the eastern end the route consists of an open valley. The intervening three miles are blocked by a glacier and a ridge. A two-mile tunnel and a second tunnel or rock cut half a mile in length would overcome these difficulties. The soundings in Passage Canal show that it is a deep fiord suited to shipping similar to the other arms of Prince William Sound. This shorter route to tidewater would have the advantage of eliminating the somewhat heavy grades encountered between Seward and Turnagain Arm (there are two summits, 700 feet and 1,065 feet high respectively).

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[2] See footnote 1, third item.

[3] Text reproduced in *U. S. Geol. Survey Bull. 592*, pp. 48-50.

[4] *U. S. Geol. Survey Bull. 592*, pp. 50-52, with map, 1:62,500 (Pl. II).

[5] Chart No. 8550, edition of May, 1915.

The economic resources for which these routes provide an outlet are among the most important of the Territory. About 30 miles east of the mouth of the Copper River and a short distance inland lies the Bering River coal field, one of the two Alaska coal fields containing the largest amount of high-grade coal. The surveyed parts of the field embrace about 22 square miles underlain by anthracite and about 28 square miles underlain by semi-bituminous and semi-anthracite coal. Most of this is as yet untouched, awaiting only proper transportation facilities. Outlet by way of the adjacent sea is rendered difficult by the unprotected nature or shallowness of the only available harbors, Katalla and Controller Bay, and the Alaska Railroad Commission has therefore recommended the construction of a branch from the Copper River railroad to tap this important area. This branch would also serve the petroleum oil fields opened up a few years ago near Katalla.

About 100 miles above its mouth, the Copper River receives from the east a large tributary, the Chitina. Its valley is the site of an important belt of copper ore, over 100 miles long and 5 to 10 miles wide. Since 1911 this region has been made accessible by a railroad branching off from the main line at Chitina and ascending the valley for 64 miles to Kennicott (Fig. 5). Here is located the Bonanza Mine which is producing and shipping $1,000,000 worth of copper per month. Immediately adjoining is the Nizina gold placer district. By extending this branch line to the east over Skolai Pass another copper-bearing area of much importance could be tapped at the head of the White River.

On reaching the Tanana the Copper-Delta River route enters into one of the important agricultural areas of the Territory. In the Tanana Valley below the Delta River there are, according to a recent estimate,[6] 4,500,000 acres of tillable land, of which only several hundred are at present under cultivation. While the grow-

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[6] H. H. Bennett and T. D. Rice: Soil Reconnoissance in Alaska, with Estimate of Agricultural Possibilities (202 pp.; maps, ills.), from *Field Operations of the Bureau of Soils, 1914*, Washington, 1915, p. 184.

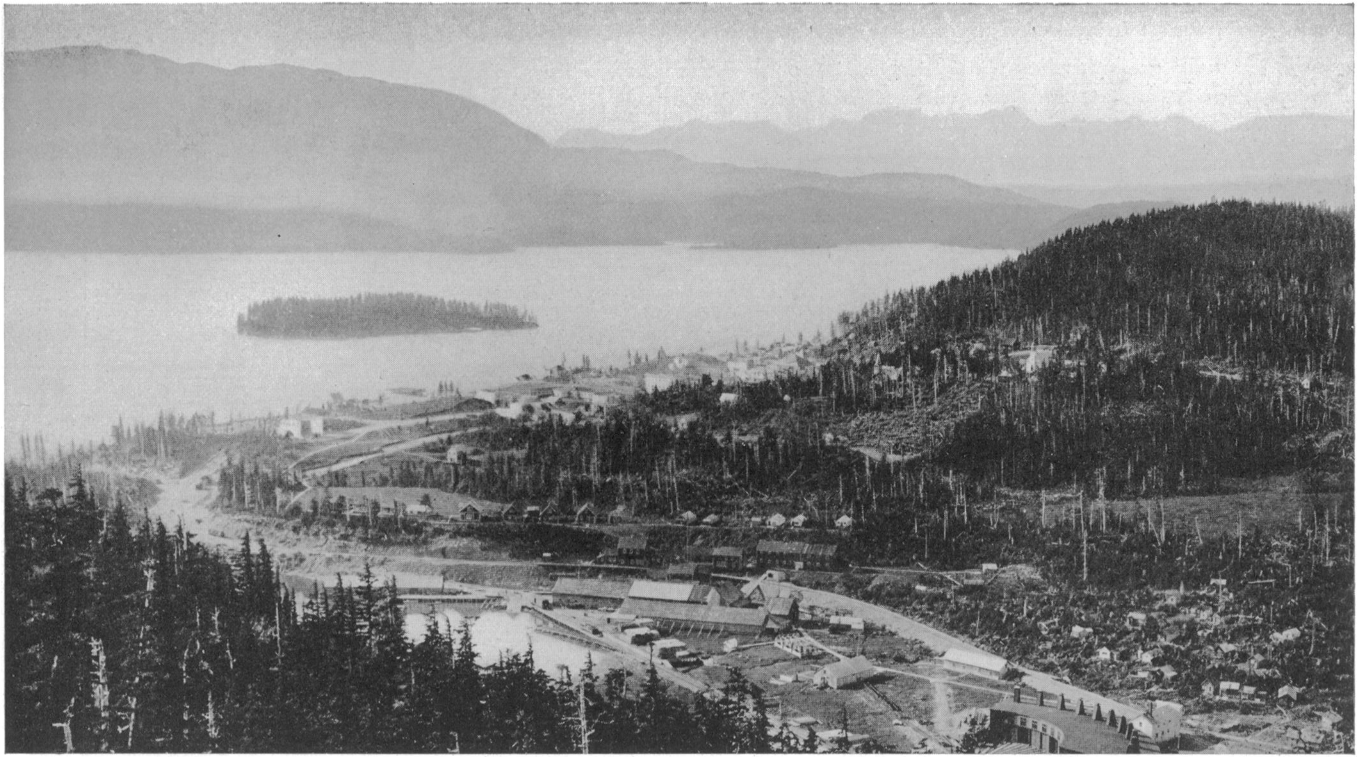

FIG. 2—Cordova, Alaska, viewed from the southeast. Cordova lies on a narrow inlet enclosed between the mainland and Hawkins Island, the bold ridge in the middle background. The town lies at a point where a transverse gap through the range at its back reaches the inlet. This depression, seen in the foreground, is followed by the Copper River railroad. The open sea lies only 15 miles away, by following the inlet to the left, as seen in the view; but as this is shallow, the route for shipping turns to the right, around Hawkins Island, and out of Prince William Sound by way of the strait between Montague and Hinchinbrook Islands—a distance of nearly 60 miles (see map, Fig. 6).

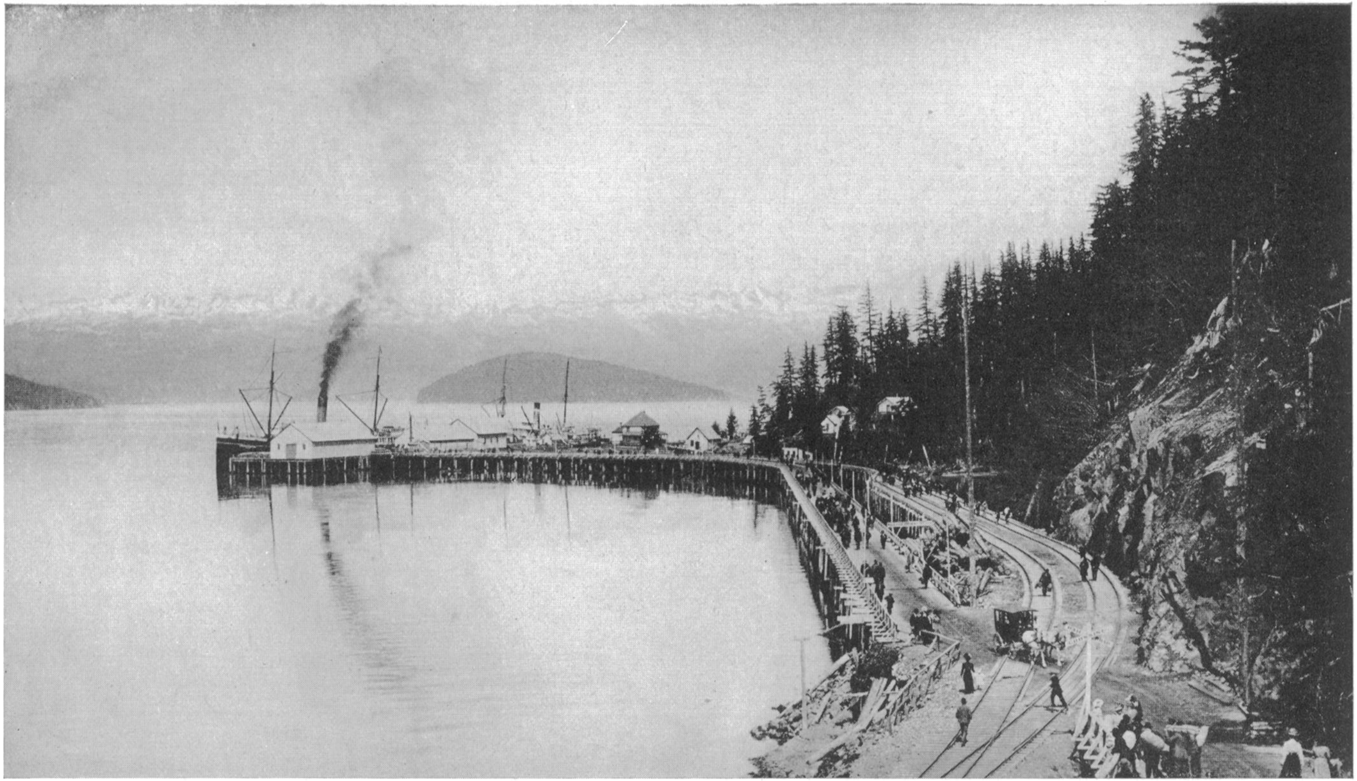

FIG. 3—The Copper River & Northwestern Railway Company's dock at Cordova. This is the point of transshipment for the copper ore from the Kennicott district to the Puget Sound Smelters. Chugach Mountains in the background.

ing season is short (90 to 120 days) the additional length of daylight due to the high latitude acts as a compensating factor. The main products are potatoes and other hardy vegetables, such as cabbage, carrots, beats and turnips, and hay. Although grain is as yet not grown extensively, it is an established fact that it can be matured. While the district can not be expected to raise products for export, at least under conditions which can now be foreseen, it has every prospect of becoming the supply center for the local market. In 1910 it had a population of over 4,000. This is mainly concentrated in the Fairbanks gold district. Since their discovery in 1902 its placers have yielded $153,000,000 worth of gold. The value of the gold output of 1912 was about $4,300,000; of 1914, over $2,700,000.

The resources of the Susitna-Nenana route are no less important. Along the valley which forms the upper continuation of Knik Arm, and extending for about 50 or 60 miles from a point 25 miles above the head of the inlet, lies the Matanuska coal field. This and the Bering River field, referred to above, are the two most important coal-bearing areas of Alaska. In the surveyed part of the field the productive area is estimated to be 74 square miles. The coal varies in quality from a lignite to a bituminous and anthracite coal, with the bituminous predominating. The Matanuska field can best be tapped by a branch from the Seward-Fairbanks railroad, beginning at the head of Knik Arm. Its construction is now under way.

Beyond the Alaska Range, on its outer slope, lies the Nenana coal field. Although it is the largest known field in Alaska (165 square miles) no attempt has been made to mine any of its coal because of lack of transportation facilities. Its coals are all of a lignitic character, but as they lie north of the Alaska Range they could be transported for local use to Fairbanks in competition with the better fuel from the Matanuska field.

In the Susitna lowland the Susitna-Nenana route serves an area which promises to become the foremost agricultural area of Alaska. It is estimated that 2,000 square miles will be available for cultivation. Potatoes and forage crops have already been grown successfully, and the same crops that are raised in the Tanana lowland will flourish here better, if anything, than there because of the longer growing season. The greater part of this area is forested; a large amount of timber will thus become available in clearing the land for cultivation; proper conservation of the remainder will insure an adequate supply to satisfy local demands.

Not only the hinterland of Prince William Sound is of economic

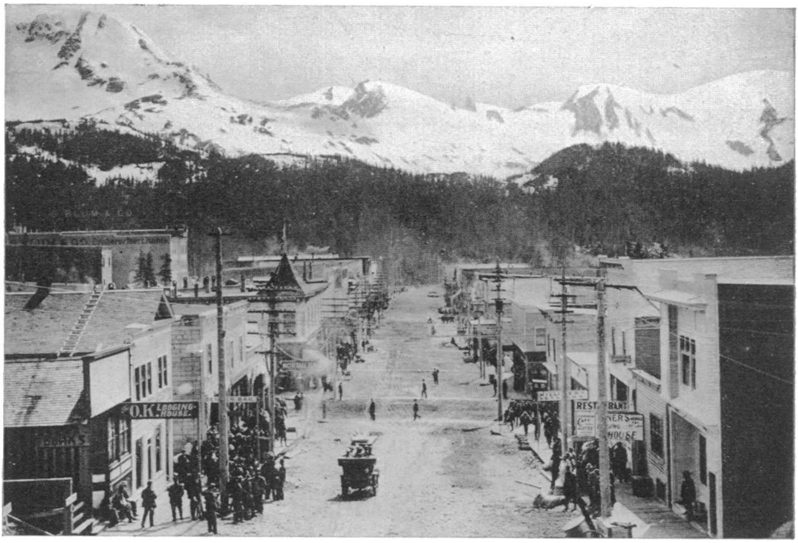

FIG. 4.

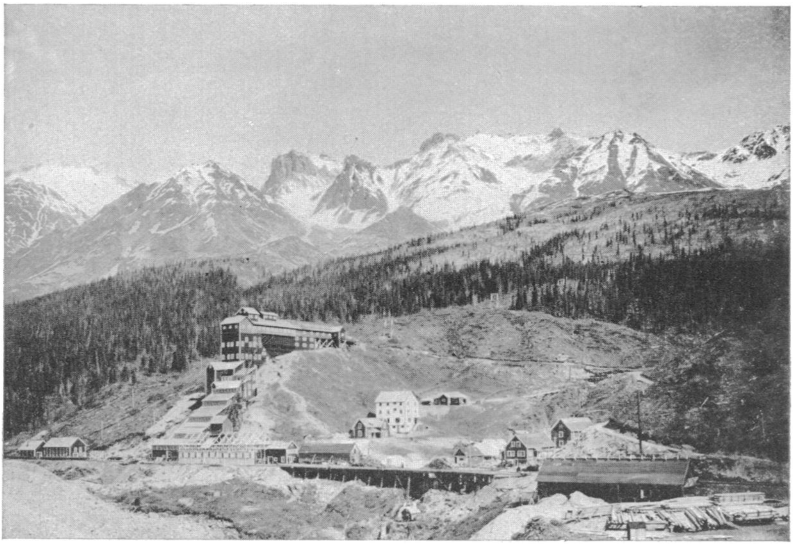

FIG. 5.

FIG. 4—First Street, Cordova, Alaska. The mountains in the background are a local southwest-trending spur of the Chugach Mountains, at whose western, seaward foot the town lies. The forested ridge in the background is the same as that seen on the right in Figure 2.

FIG. 5—Kennicott, the center of the Chitina copper mining district. Kennicott is the present terminus of the Copper River & Northwestern Railway. The mountains in the background are part of the Wrangell Mountains.

importance, but the immediate region of the sound as well (map, Fig. 6). The two principal industries are mining and fishing. Copper is the chief mineral, although some gold is also found. In 1913 and 1914 the production of the district was valued at $1,328,000 and $1,200,000 respectively. During 1914 a mine on Latouche Island, in the southwestern part of the sound, produced 4,500 tons of copper ore per month. Latouche Island, Knight Island, adjoining it to the north, and the eastern shores of the sound are the main mineralized areas. The Ellamar district, on the northeastern shore, is the chief copper-producing area. Salmon is the principal fish caught. The principal fishing grounds are off the delta of the Copper River. At Orca near Cordova a cannery is operated whose output averages fifty thousand cases a year.

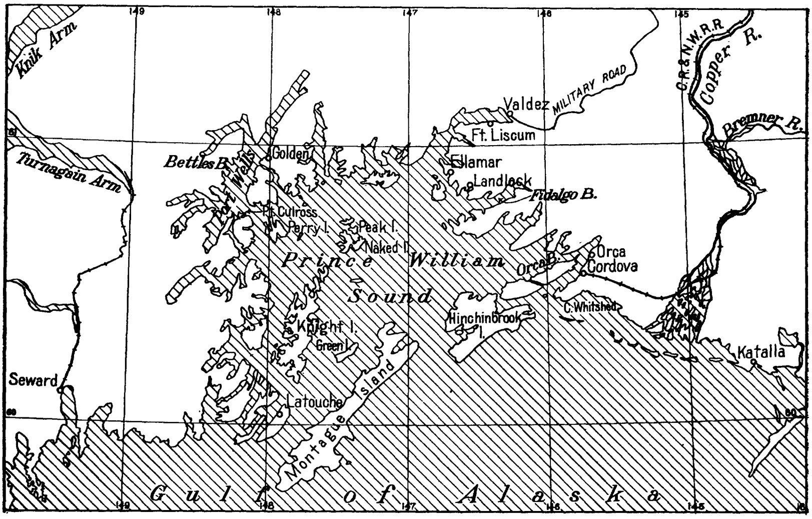

FIG. 6—Sketch map of Prince William Sound, Alaska. Scale, 1:3,333,000.

These various industries and trade opportunities have led to the concentration of a considerable population along the shores of the sound. The two principal towns are Cordova and Valdez. Cordova had a population of about 1,200 in 1910, Valdez, including the military reservation adjacent to the town, of about 1,500. Both towns are provided with hotels, stores, a bank, schools, churches, telephone and electric light systems, daily newspapers and a fire department, and show every evidence of enterprise and growth (Fig. 4). Other settlements are Orca, near Cordova, Land Lock and Ellamar on the eastern side of the sound. Seward, the terminus of the Susitna-Nenana route to the west, had a population of over 500 in 1910.

Its importance as the gateway to the interior has given Prince William Sound excellent connections with the outside world. Most of its commerce is with Puget Sound, although there is some traffic with San Francisco. The cable as well as the regular steamship lines connect with Seattle. Of the two companies operating steamship service, one despatches a steamer every six days from Seattle, the other about three times a month. The steamers in the service average 300 feet in length and 3,000 tons gross tonnage. The distance from Cordova to Seattle is 1,400 statute miles and is covered in five days. The natural configuration of the sound (map, Fig. 6) makes it an ideal haven for shipping. Representing, as it does, the southern slope of the Chugach Mountains into which the sea has penetrated, its shore line is made up of a great number of fiords and inlets whose deep water and sheltered position afford excellent harbor sites. Both Valdez and Cordova are thus situated: Valdez at the head of a fiord, Cordova on the shore of an inlet protected by an island lying in front of it (Figs. 2 and 3).

Such, in brief, is the present geographical condition of the Prince William Sound region. Its future possibilities are apparent, and there is no doubt that the new era of railroad construction will contribute materially to the realization of their full development.

SEWARD, THE TERMINUS OF ALASKA'S NEW RAILROAD*

The selection of the Susitna-Nenana route for the railroad to be constructed by the government opens a new era in the development of Seward. The economic significance of this route, of which Seward is the outlet, has been dwelt upon in the preceding article. A few words with regard to the town itself and the resources of its immediate surroundings may therefore not be out of place.

Seward lies at the head of Resurrection Bay, one of the deep bays characteristic of the southeastern coast of Kenai Peninsula. The town occupies a bench on the western side of the bay at the foot of

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* Based on notes by E. Lester Jones, Superintendent of the U. S. Coast and Geodetic Survey, the Report of the Alaska Railroad Commission (*House Doc. No. 1346, 62nd Congr., 3d Session*, Washington, 1913), and "Geology and Mineral Resources of Kenai Peninsula" by G. C. Martin and others, *U. S. Geol. Surv. Bull. 587*, Washington, 1915.